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(54) MINERAL ABSORPTION PROMOTER COMPOSITION

(57)Abstract:

PURPOSE: To obtain a mineral absorption promoter containing oligoxylose as the active component which is excellent in the absorption ratio of Ca, P, Mg and Fe and their in vivo holding ratio, and a food containing oligoxylose as the active component and having a mineral absorption promoting activity.

CONSTITUTION: A mineral absorption promoter and a food having a mineral absorption promoting activity are prepared. Both the mineral absorption promoter and the food having a mineral absorption promoting activity respectively contain an oligoxylose mixture as the main component which is prepared by treating a natural material such as cotton seed jelly, corncob or birch wood with xylanase in an amount of $\geq 1/2$ and they are useful for improving the absorption ratio of Ca, P, Mg and Fe and their in vivo holding ratio.

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[Claim(s)]

[Claim 1] The mineral absorption accelerator which makes a xylo oligosaccharide an active principle.

[Claim 2] Food which has the mineral absorption promotion activity which comes to add a xylo oligosaccharide as an active principle.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] this invention relates to the food which has a mineral absorption accelerator and mineral absorption promotion activity. It is related with the food which has the mineral absorption promotion activity which comes to add the mineral absorption accelerator and xylo oligosaccharide which make a xylo oligosaccharide an active principle as an active principle still in detail.

[0002]

[Description of the Prior Art] For the mammals including the Homo sapiens, a mineral is an indispensable nutrition and calcium (calcium) and magnesium (Mg) are especially called the macroscopic mineral (macromineral) for the mineral comparatively required for a large quantity. calcium and P are important as a bony principal component. Moreover, if Mg runs short about Mg, calcium will enter in a cell, the vessel will shrink, and it is known that the vasoconstriction will be caused.

[0003] On the other hand, for the mammals including the Homo sapiens, compared with calcium, P, and Mg, it is a mineral important as a component of a blood pigment of what has not many required intake, and, as for iron (Fe), it is known that ischemia will be caused with shortage of Fe.

[0004] These minerals are absorbed from an alimentary canal in the type combined with the type of ion, or various factors. As mineral absorption promoting agent, the ***** oligosaccharide is known, for example and absorption by the alimentary canal of calcium, P, and Mg is promoted (a Japanese nutrition and a food society magazine, Vol.46, No.2, p123-p129, and 1993).

[0005] However, although absorption is promoted by the ***** oligosaccharide about Mg, elevation significant to the rate of an in-the-living-body hold does not accept. Moreover, although it is reported to the iron-deficiency-anemia rat about Fe that a ***** oligosaccharide promotes absorption (Heisei 5, a Japanese nutrition, and collection [of food society summaries] 109 pages), about the normal rat, it is reported that the inclination that an absorption coefficient and the rate of an in-the-living-body hold are lower than control is shown (a Japanese nutrition and a food society magazine, Vol.44, No.4, p287-p291, and 1991).

[0006]

[Problem(s) to be Solved by the Invention] Thus, since various faults are in the mineral absorption accelerator using the ***** oligosaccharide, the development of the matter in

which it excels also in the field of an absorption coefficient and the rate of an in-the-living-body hold, and the absorption promotion operation with a sufficient balance is shown to various minerals is desired. When taking in the concerned component daily for the purpose of a mineral absorption improvement furthermore, internal use is desirable and to be the thing of the gestalt which can be especially taken in with an ingesta as a combination component of an ingesta is desired.

[0007]

[Means for Solving the Problem] It is already known that a xylo oligosaccharide is an effective Lactobacillus-bifidus growth factor (a Japanese nutrition and a food society magazine, vol.43, p395-p401, and 1990), and promoting calcium absorption is also previously found out by this invention persons (Heisei 5, a Japanese nutrition, and collection [of food society summaries] 109 pages). As a result of repeating a research further zealously, this invention persons found out that a xylo oligosaccharide improved the absorption coefficient and the rate of an in-the-living-body hold of P, Mg, and Fe in addition to absorption promotion of calcium, and completed this invention.

[0008] That is, according to this invention, the food which has the mineral absorption promotion activity which comes to add the mineral absorption accelerator and xylo oligosaccharide which show the absorption coefficient and the rate of an in-the-living-body hold which were excellent about calcium, P, Mg, and Fe, and which make a xylo oligosaccharide an active principle as an active principle is offered.

[0009] The xylo oligosaccharide used for this invention means preferably real mass and the xylo oligosaccharide mixture in [all] a sugar component included about 1/2 or more for a xylo biose as the xylo biose itself or a principal component. The xylo oligosaccharide mixture (refer to JP,63-112979,A) which xylo oligosaccharide mixture can understand the natural product containing a xylan an added water part, and can manufacture it from a xylanase or an acid, for example, uses a cottonseed Japanese parsley, a corncob, birch wood, etc. as a raw material, is processed and obtained by the xylanase of the Trichoderma origin, and has the sugar composition containing the xylo oligosaccharide about 1/5 of 1 or 3 or more sugar for xylose about 4 minutes which is 1/2 or more xylo bioses and monosaccharide which are a

[0010] The mineral absorption accelerator which makes the xylo oligosaccharide of this invention an active principle is preferably prescribed for the patient as an oral agent. As an example of such dosage forms, a capsule, a tablet, a granule, a fine-grain agent, the syrup, the dry syrup, the trochiscus, etc. can be mentioned.

[0011] What is necessary is to make into an active principle the xylo oligosaccharide obtained as mentioned above, and just to tablet-ize combining the well-known adjuvants for drug, such as an excipient, a binder, disintegrator, a lubricant, and a corrigent, according to a conventional method, in order to manufacture the mineral absorption accelerator which makes the xylo oligosaccharide of this invention an active principle. It is thought that the xylo oligosaccharide which is the principal component of the active principle of this invention reaches the intestine which is the mineral absorption location, without receiving hydrolysis within an alimentary canal since not being decomposed with various digestive enzymes is known (starch science of 37th No. 2 76 page 1990). Therefore, it is also possible for special processing of enteric coating etc. to add in type as it is in a usual ingesta as powder or solution unnecessarily in case of tablet-izing. Moreover, in order to make mineral absorption increase, it is also possible to add and tablet-ize the mineral which is going to carry out absorption promotion.

[0012] What is necessary is just to usually let the mineral absorption accelerator which makes the xylo oligosaccharide of this invention an active principle be the medication unit which can prescribe 0.5-10g for the patient by taking orally in 1 - 3 steps preferably 0.1-50g of adult 1 sunny. These dose can be suitably fluctuated according to weight, age, etc.

[0013] Moreover, the food which has the mineral absorption promotion activity which comes to add the xylo oligosaccharide of this invention as an active principle can be manufactured by adding the xylo oligosaccharide obtained as mentioned above in the usual ingesta. Although there is especially no limitation in the modality of food which can be added, since sweet taste is in a xylo oligosaccharide, it is desirable to add for the strong food of sweet taste, such as drinks, such as a fruit-juice drink, a soft drink, a milk beverage, a sport drink, the ardent spirits, a coffee drink, and a tea drink, ice cream and chocolate, a candy, a biscuit, the drop, a caramel, a cookie, a cake, sum confectionery, ****, chewing gum, a starch syrup, a rice cracker, sherbet

[0014] Thus, since the absorption coefficient and the rate of an in-the-living-body hold of calcium, P, Mg, and Fe are improved by taking in the obtained ingesta daily, a prevention and curative effect of bone diseases, such as osteoporosis, ischemia, etc. are expectable.

[0015] What is necessary is just to usually add the addition of the xylo oligosaccharide in such an ingesta to object food by 1 - 20% of the weight of within the limits that what is necessary is just to add in the domain which does not spoil the taste of food original according to the modality of object food.

[0016] The xylo oligosaccharide used for this invention processes natural products, such as a cottonseed Japanese parsley, a corn cob, and birch wood, by the xylanase (for example, thing of the Trichoderma origin) as mentioned above, and is obtained, and there is especially no point that becomes a problem in safety.

[0017] Next, the evaluation technique of the absorption coefficient of calcium, P, Mg, and Fe and the rate of an in-the-living-body hold is briefly explained about the xylo oligosaccharide which is the active principle of this invention.

[0018] It breeds one SD rat at a time in the cage for metabolism, and the amount of baiting in a duration of test and ***** are recorded, all of the excrement and the urine which were discharged are collected, formula (1) - (3) defines intake (a), the absorbed dose (b), and the amount (c) of in-the-living-body holds, and a coefficient of digestibility and the rate of an in-the-living-body hold are computed by the formula (4) and the formula (5).

[0019] Formula (1): The food taken in during intake (a) = And the amount type of minerals contained in drinking water (2) :absorbed dose (b) = (a) The amount type of minerals contained in the excrement excreted during - (3) -- the amount type of minerals contained in the urine excreted during amount (c) =(b)-amount (c) of in-the-living-body holds / rate [of absorbed-dose (b) / (4):coefficient-of-digestibility (%) = {intake (a)} x100 formula (5):inside-of-the-body hold] (%) = {intake (a)} x100, i.e., the absorbed dose, [of :inside-of-the-body holds] It is the amount which deducted each amount of minerals contained in excrement from each amount (intake) of minerals contained in the food which the rat took in, and the amount of in-the-living-body holds is an amount which deducted each amount of minerals contained in urine from the absorbed dose. Thus, the coefficient of digestibility and the rate of an in-the-living-body hold of calcium, P, Mg, and Fe are calculated, and the data of a xylo oligosaccharide medication group are compared with the data of the group non-prescribing a medicine for the patient.

[0020]

[Function] The xylo oligosaccharide which is the active principle of this invention improves the

absorption coefficient and the rate of an in-the-living-body hold of calcium, P, Mg, and Fe, as shown in the after-mentioned example. This makes what prevents or treats bone diseases, such as osteoporosis, ischemia, etc. effectively conjecture, in order that the mineral absorption promotion constituent of this invention may improve the absorption coefficient and the rate of an in-the-living-body hold of calcium, P, Mg, and Fe.

[0021]

[Example] Subsequently, although this invention is explained in detail based on an example, this invention is not limited to these examples.

[0022] the accounts examination (a) feeding condition: subject animal of the mineral in an example 1. rat ***** -- SD system male rat (it purchases from Japanese book Clare) of 6 week-old -- the object for rats -- it bred to metabolism cage LC-0353 (made in Japanese book Clare) with every one animal and B alteration AIN combination powder feed (product made from Oriental Yeast) Feeding conditions were made into the temperature of 23.5**2 degrees C, 55**10% of humidity, 15 ventilation rates/o'clock, the all fresh air method, and the 12 hour light-and-darkness cycle at 7:00- lighting time 19:00.

[0023] (b) The group division rat of a laboratory animal was made into one groups [six], the group division was carried out at 2 of a control group (the 1st group) and an examination group (the 2nd group) groups, sterilization demineralized water was given as drinking water, and, as for the 1st group, the 2nd group gave the xylo oligosaccharide sterilization demineralized water solution 2% as drinking water. The xylo oligosaccharide used commercial xylo oligo 70 (Suntory make). The sugar of xylo oligo 70 is 70% of syrup, and sugar composition is the xylo oligosaccharide about 1/5 of 1 or 3 or more sugar for xylose about 4 minutes which is 1/2 or more xylo bioses and monosaccharide which are a principal component.

[0024] As for the inside of a duration of test, each group made it free **** and free drinking water, and feed and drinking water were exchanged 3 times per week. Into the duration of test, especially the difference of weight change, the amount of baiting, and ***** was not accepted in each group.

[0025] (c) After (2) during three days medication starting [of four days before of seven days before of mineral accounts examination (1) medication start], after (3) during four days medication starting from the 7th to the 10th, over three terms for four days from the 14th to the 17th, the amount of baiting and ***** were recorded, and whole-quantity separation extraction of excrement and the urine was carried out, and the accounts examination was carried out. The mineral content of feed and the mineral intake in the amount blank-test term of baiting were calculated. The extracted excrement was freeze-dried and saved, the 0.5g was extracted twice by the physiological saline containing the 25ml hydrochloric acid of 0.1N, the content of calcium, P, Fe, and Mg was measured for the supernatant liquid using the blood serum analysis apparatus (Hitachi and 7050 type), and the mineral discharge in excrement was calculated. The extracted urine measured the content of calcium, P, Fe, and Mg similarly using the blood serum analysis apparatus, and calculated the mineral discharge in urine.

[0026] From the obtained data, it asked for the absorption coefficient and the rate of an in-the-living-body hold about calcium, P, Fe, and each Mg using formula (1) - (5). A result is shown in drawing 1 - view 8.

[0027] Drawing 1 shows the absorption coefficient of calcium and drawing 2 shows change of the rate of an in-the-living-body hold of calcium. From this result, making the absorption coefficient and the rate of an in-the-living-body hold of calcium increase intentionally made the

xylo oligosaccharide clear.

[0028] Drawing 3 shows the absorption coefficient of inorganic Lynn, and drawing 4 shows change of the rate of an in-the-living-body hold of inorganic Lynn. From this result, as for the xylo oligosaccharide, making it increase intentionally made clear the absorption coefficient and the rate of an in-the-living-body hold of inorganic Lynn by the data for the 1st [at least] week.

[0029] Drawing 5 shows an iron absorption coefficient and drawing 6 shows change of the iron rate of an in-the-living-body hold. From this result, making an iron absorption coefficient and the iron rate of an in-the-living-body hold increase intentionally made the xylo oligosaccharide clear.

[0030] Drawing 7 shows the absorption coefficient of magnesium and drawing 8 shows change of the rate of an in-the-living-body hold of magnesium. From this result, making the absorption coefficient and the rate of an in-the-living-body hold of magnesium increase intentionally made the xylo oligosaccharide clear.

[0031] 21% fermented milk of manufacture milk solid contents of an example 2. lactic acid bacteria beverage 14.76g fruit-sugar grape-sugar liquid sugar 9.31g pectin 0.50g citric acid 0.08g perfume 0.15g xylo oligosaccharide 2.00g water Residue whole quantity The 100.00g above-mentioned component was mixed and the lactic acid bacteria beverage was manufactured according to the conventional method.

[0032] Manufacture DL-sodium tartrate of an example 3. health drink 100mg succinic acid 9mg liquid sugar 800g citric acid 12g vitamin C 10g xylo oligosaccharide 200g perfume 15ml potassium chloride 1g sodium aspartate 300mg magnesium sulfate 500mg purified water After having melted the above-mentioned component in about 7l. of residue purified waters, having added the purified water and making the whole quantity into 10l., the carbon dioxide was blown and the health drink containing carbonic acid was manufactured.

[0033] The manufacture granulated sugar of an example 4. candy 50g starch syrup 46g xylo oligosaccharide 2g citric acid 0.5g lemon perfume 0.5g purified water The candy was manufactured so that it might cool after carrying out heating fusion of granulated sugar and the starch syrup according to 1g conventional method, adding the citric acid and lemon perfume which were suspended in the xylo oligosaccharide and the purified water and carrying out a mixing uniformly, and it might be set to 2g per grain.

[0034] Manufacture chocolate liquor of example 5. chocolate 18.0g cacao butter 18.0g milk powder 15.0g lecithin 0.5g xylo oligosaccharide 2.0g sugar After it carried out heating fusion of the above-mentioned component and it carried out the mixing uniformly according to 46.5g conventional method, it cooled with the chocolate type and chocolate was manufactured.

[0035] Manufacture xylo oligosaccharide of an example 6. capsule 50 weight section lactose 198 weight section magnesium stearate After mixing and carrying out the making tablet of a xylo oligosaccharide and the lactose at a rate of 2 weight section above, it ground, the magnesium stearate was mixed with this, every 250mg No. 1 capsule was filled up with mixture, and the capsule was manufactured. A 50mg xylo oligosaccharide is contained in 1 agent.

[0036]

[Effect of the Invention] According to this invention, the food which has the mineral absorption promotion activity which comes to add the mineral absorption accelerator and xylo oligosaccharide which show the absorption coefficient and the rate of an in-the-living-body hold which were excellent about calcium, P, Mg, and Fe, and which make a xylo oligosaccharide an active principle as an active principle can be offered.

[0037] The xylo oligosaccharide used for this invention processes natural products, such as a

cottonseed Japanese parsley, a corn cob, and birch wood, by the xylanase of the Trichoderma origin, and is obtained, and there is especially no point that becomes a problem in safety. Therefore, the food which has the mineral absorption promotion activity which comes to add the mineral absorption accelerator and xylo oligosaccharide containing the xylo oligosaccharide which does in this way and was obtained can be taken in daily, and since the absorption coefficient and the rate of an in-the-living-body hold of calcium, P, Mg, and Fe are improved, a prevention and curative effect of bone diseases, such as osteoporosis, ischemia, etc. are expectable.